

International Conference on Renewable Energy for Developing Countries

Remarks by Congressman Honda

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Thank you very much for having me here to speak and for attending the conference. I hope the past two days have been fruitful for all of you.

Let me also express my thanks to Dr. Samuel Lakeou of the University of the District of Columbia Department of Electrical Engineering; Dr. Aboise Adebayo of the UDC Department of Engineering, Architecture, and Aerospace Technology; and Dr. Ben Latigo, Dean of the UDC School of Engineering and Applied Sciences for inviting me to be here today.

As was mentioned in the introduction, I serve as the Ranking Democratic Member of the Energy Subcommittee of the House Science Committee, which has jurisdiction over energy research and development programs here in the United States. I also hail from Silicon Valley, a hotbed of development of new technologies.

I am also the founder and Chair of the Congressional Ethiopia and Ethiopian American Caucus. The caucus was formed to help create a voice for the specific concerns of the Ethiopian American community and to strengthen the relationship between Ethiopia and the United States. I visited Ethiopia in 2005, and it was an experience that changed my life.

The space in which these two areas overlap is the topic of this conference. From my time in the Peace Corps in El Salvador to my recent visit to Ethiopia, I have been struck by how these nations and others could benefit from the widespread use of renewable energy.

Why are energy alternatives necessary?

I've been talking about the need to expand the use of renewable energy for years, but it has been hard to get attention paid to this issue in a town where the oil, gas, and coal industries have such strong ties to the Administration and the majority party in Congress.

But as of the State of the Union address, even President Bush admits that American is addicted to oil, and that we need to do something about it, although he hasn't been quite as clear about what he thinks we should do.

What can we do? In the short term, we need to use our fossil fuels more efficiently, but in the long term, we are going to need to move away from fossil fuels altogether, because these are fundamentally finite.

I think we need to separate transportation from the rest of the uses of energy for these purposes. Let's consider everything but transportation for a second.

There are a few options – we could consider expanding hydroelectric, have more nuclear. These raise as many questions as they provide answers – hydro resources are limited by geography, and the surface storage of water and reduced water flows down rivers can have serious environmental impacts. Nuclear fission, while not producing greenhouse gas emissions, itself relies on a finite fuel supply, and dealing with the waste is an issue we haven't figured out a good answer to. My subcommittee had a hearing on the President's proposed Global Nuclear Energy Partnership yesterday, and during the hearing we heard few details and even more questions. Nuclear fusion may hold promise in the long term, but is still at the research stages and the feasibility of a power generating reactor has not yet been demonstrated.

Some of these technologies might help out with transportation, if the installed generation capacity is large enough. We can think about electric cars, if we can develop the batteries needed to store all of the electricity, or we can think about hydrogen cars, if we can come up with the fuel cells that will be needed to power the vehicles and the infrastructure needed to supply the hydrogen to the vehicles.

These are all options that the US has the luxury of thinking about, but they are all VERY, VERY expensive. The private sector isn't willing to make the infrastructure investments that are needed to expand generation in these areas, so the government has to provide incentives and subsidies to make them possible.

Cost concerns for developing countries

Developing countries don't have the luxury of thinking about expensive energy solutions. For the poorest countries, energy is a source of their poverty. 38 of the poorest countries are net importers of oil, and 25 of them import all of their oil. At oil prices of over \$60 per barrel, these countries are being disproportionately impacted.

The top recipients under the Heavily Indebted Poor Countries Initiative are spending the money save from debt relief on the increasing price of oil rather than on educating their kids, fighting HIV/AIDS, providing clean water, or increasing access to health care. Approximately 2 billion people worldwide are left without reliable energy sources, without refrigeration, without basic communication, heat, or even light because of the high cost and inaccessibility of fossil fuels.

Even in Nigeria, Africa's richest oil producing country, the people are impoverished. In 2002, revenue from crude oil was approximately \$11 billion, but half of that revenue was stolen or wasted by corrupt officials. The corruption stemming in part from a centralized oil revenue system is not just fueling poverty, but helping to fuel an armed conflict.

The role of climate change and its particular impact on developing countries

Another factor that I believe we should consider is climate change. Unfortunately Republican politicians in this town don't – a National Journal poll of Congressional Insiders revealed that 98% of Democrats believe that it has been proven beyond a reasonable doubt that the Earth is warming because of man-made pollution, while 77% of Republicans do not believe so. Scientists agree, however, and some even worry that we have already crossed the tipping point past which any action we take won't be able to completely reverse the impact of human activity on climate.

To actually address climate change, the world will need to generate electricity and power transportation systems without releasing carbon dioxide. The US is the biggest offender, releasing the most greenhouse gas emissions, and so it is incumbent upon us to take the lead in reducing emissions. Unfortunately, we are not taking those steps that other nations are, such as capping carbon emissions.

In this case, the wealth of the US seems to be lulling people into a false sense of security. They think that because we have many resources, we will be able to adapt to any changes in climate that may occur, however costly they might be.

This isn't an option for developing countries, just like hydroelectric and nuclear are not options there, either. The financial resources required are just too great, especially because the effects of developing regions of the world are most prone to suffering the effects of climate change

In part, this is because the world's poor live in areas more prone to natural disasters, drought and disease. 14 countries in Africa are already subject to water stress and within the next 25 years that number will almost double. In Southern Africa and parts of the Horn, rainfall is predicted to decline by 10 percent by 2050, worsening already serious food shortages. And between 260 and 320 million people are likely to find themselves living in malaria infested areas by 2080.

To make matters worse, climate change threatens developing communities in particular because they depend on natural resources for income. As the *Washington Post* reported recently, the Inuit in the Arctic are already feeling the effects of climate change. As the ice melts, the earth opens up and drives away animals they hunt for food and swallows their homes and fishing equipment.

Climate change will also adversely affect economies that depend on agriculture. Crop yields in sub-Saharan Africa are projected to fall by 20 percent with global warming. With growing demand and declining yield, Africa will become more dependent on costly food imports.

Famine that may result from climate change could potentially displace more than 250 million people worldwide by 2050, which will destroy communities and disrupt the institutions that countries rely upon to exist – their workforce, their educational system, etc.

Developing countries are the ones least responsible for climate change, but they are most susceptible to it. That means they are the countries that need new, greenhouse emissions free technologies the most, but they are least able to afford expensive solutions. That's why we need to focus on solutions that can address the problem but are also affordable.

We must face the fact here in the US that we can't separate the fate of the developing world from ours. Climate is global, and if we make changes but the developing world does not, the

climate will continue to be affected, and vice versa. Everyone must be on board. In addition, when climate change starts to impact other countries, that will inevitably affect the US – with immigration, trade, and international relations impacted. So we must be a leader in developing the affordable solutions to the energy problem.

Renewable energy is the answer – distributed nature of renewables helps

Fortunately, there is such an answer. Renewable energy in its various forms – solar, wind, biomass, ocean and tidal energy, and others – has many characteristics that make it particularly useful in the developing world, as well as providing assistance here in the US and other developed nations.

How can we best do that? Using renewable sources for electricity that are distributed throughout developing countries, generating electricity where it is needed. I'm thinking about solar panels installed on remote buildings or small scale wind power to provide the energy needed to provide light and wireless communications access to people who currently do not have access to it.

Unlike centralized electricity generation, distributed generation doesn't require a large investment in transmission wires and power stations. So not only does a country not have to spend a lot to build a power plant, it doesn't have to spend a lot to move the electricity to where it is needed.

Especially in developing nations, where infrastructure links between rural communities or remote settlements may not be well developed, an approach to energy that does not depend on hard-wired infrastructure is essential to rapid success.

Look at India. Solar water pumps are replacing diesel generators to power irrigation there. This increases the productivity of the farms; it saves farmers money on fuel, and creates jobs for manufacturing the pumps and replacement parts.

Potential of biofuels in agriculture based economies

We can also draw upon the agricultural strengths of these developing countries to provide fuel for vehicles. Currently, two-thirds of the people living in the developing world make their living

through agriculture.

Biofuels, which are derived from plants and agricultural waste and can provide a cleaner, more sustainable alternative to oil, have enormous potential to improve the situation of small farmers who cannot compete in the global market as it exists today.

Farmers who produce energy crops will be able to grow their incomes and their own supply of energy. Biofuels will generate new industries, new technologies, new jobs, and new markets, all while reducing the amount countries must spend on energy, which will enable developing countries to put more of their resources into services for their neediest citizens.

Brazil provides a great example of how nations can use agriculture to make energy a source of opportunity rather than a source of oppression. When I was there last year, I learned how the Brazilian government has provided the necessary support to make ethanol derived from sugarcane a common source of fuel.

By the end of last year, 70% of the new cars sold in Brazil were Flex Fuel Vehicles, putting the nation on the path to energy self sufficiency and leading to lower consumer costs to fill up the fuel tank of their vehicles. This is quite a change from the past, when Brazil imported 80 % of its crude oil.

Brazil has also demonstrated a possible competitive advantage that developing countries in the tropics and subtropics might have in this area. Longer and more productive growing seasons have the potential to make these nations leaders in biofuels, assuming we can mitigate the effects of climate change on crops.

To achieve success in expanding the use and distribution of biofuels in the developing world, we have to be careful to involve the local community in the planning process. We need to make sure local residents are involved in making decisions about what crops are grown and providing guidance about what the local crop production capacity is.

An example of the success that can be had when taking into account local factors is Jatropha,

which can be converted to biodiesel. Jatropha is a drought resistant perennial that can grow in the poorest of soils. Today, in India it is being used to bring agricultural wastelands back under cultivation.

In Mali, women's groups use biodiesel generators that run on oil from Jatropha shrubs. Villages with these generators have increased the number of girls in school and increased local incomes. The potential exists for this success to be realized widely - over half of the land in Africa is considered suitable for Jatropha cultivation.

Solar and wind

I'm from California, so I have a natural affinity for the sun, although you wouldn't know it based on the weather we have been having there lately.

In California, we have significant renewable energy capacity in a number of areas, two of which stand out as being applicable in many developing nations – solar and wind. These are technologies that are also directly applicable to the developing world.

Solar photovoltaics and small wind generation are well suited to the distributed generation approach to renewable energy, because they can be installed simply and unobtrusively in remote locations without the need for massive infrastructure, and they can be scaled to whatever the local energy needs are.

For example, a friend of mine is involved with a program called the Microsolar Distance Learning Program. In the Galapagos Islands, solar energy is used to provide power for computer labs and wireless communications that allow for distance learning and networking between learning institutions, hospitals, and administrative offices.

In the distance learning program, students learn about monitoring the solar energy sources and about modern, efficient use of energy. If not for the distributed, renewable nature of the solar energy source, the project would not be possible.

As this project demonstrates, the technology exists today, although it struggles to compete

against subsidized forms of energy and those which do not have to pay for the pollution they create. We must do more to help overcome this obstacle, and my home state of California is trying through its California Solar Initiative.

By increasing the size of the market for solar energy here, we can reduce prices and make this more affordable for developing countries.

In order to more fully realize the potential of wind and solar energy, it is important that we know what resources exist in developing countries. For example, the Ethiopian Energy Development Centre, the Ethiopian Rural Energy Development & Promotion Center and the National Meteorological Service Agency are cooperating with the German Aerospace Center (DLR), the Risø National Laboratory and the National Renewable Energy Laboratory (NREL) in the production of wind and solar assessments for Ethiopia.

Three assessment products are under development: 1) a high (10-km) resolution solar map; 2) a medium (40-km) solar map; and 3) a 5-km wind map. A geospatial toolkit will integrate the solar and wind data with GIS data to support an overall solar and wind energy resource assessment.

Research and Development needs

We've got some good technologies that are ready to implement today, as I've mentioned. But we also need to continue to invest in research and development to come up with new options.

The need to invest in research for alternative fuels is one thing that Democrats and a majority of Republicans seem to be able to agree on, at least according to a National Journal poll of Congressional "insiders."

There are a number of areas that this research should focus on. In the area of biofuels, research efforts can help develop dedicated energy crops that are cost-effective, easy to sustain, and which can produce greater energy yields.

We have seen this kind of thing work in the past - Brazilians have been able to triple the liters of

ethanol per hectare of sugarcane for their farmers and Indian scientists have sped up the process for the Jatropha plant to yield oilseeds used for bio-diesel—cutting output time from 2 years to 7 months.

In the area of solar photovoltaics, new fields such as nanotechnology offer the opportunity to develop solar cells that can generate electricity using more wavelengths of the sun's light and collect all light more efficiently. Additional research is needed to improve materials and to reduce cost.

To try to help encourage nanotechnology research in these critical areas, I am working on a bill that would create grant programs for nanotechnology research and development specifically targeted to solving energy challenges and environmental challenges.

With the right resources, the global scientific community can continue down the path to progress, and it's our job in Congress to see that they get the support they need, though funding for US scientific research and partnerships between scientists throughout the world.

Ancillary benefits of renewable energy for developing countries

In my job, one of the things that I have to worry about is international relations. Both energy and climate change are pieces of this bigger picture. Fortunately, renewable energy offers opportunities to make this big picture a little bit less complicated.

Currently, developing nations are dependent on other countries' natural resources, and they are unable to invest in improvements within. This leads to humanitarian crises which require international responses and human suffering.

In a world focused on using renewable energy, developing countries could instead use their own living resources to power their development and enhance their economies. They could be the place the world looks for supplies of biofuels, rather than the current dangerous geopolitical dynamic in which the world relies upon the Mideast for oil.

Throughout history, wars have been fought over non-renewable natural resources. In a world

focused on using renewable energy, these conflicts could be avoided and greater stability achieved.

In a country where farmers grow energy crops, they will control their own access to energy rather than being dependent upon a central government. In a country with widespread use of photovoltaic solar generation and wind power, local communities will determine how much energy to produce and can even become suppliers to other communities.

Because of the distributed nature of renewable energy, in a country where renewable energy is embraced the energy is in the hands of the people, not in the hands of multinational corporations or dictators. By encouraging the use of renewable energy, we can “democratize energy” and realize revolutions in political systems, standards of living, and environmental protection.

What the US is doing to help encourage international use of renewable energy

Our history of research and development has shown great achievements in developing renewable energy technologies, but it has also shown that it is necessary to have policies to encourage the use of those discoveries in the developing world and developed world or they will sit on the shelf.

The US recognizes that it must take a leading role, and through the Department of Energy’s National Renewable Energy Laboratory, we are undertaking a number of efforts to enhance technology transfer of renewable energy technologies to the developing world.

The NREL’s Village Power Program works to manage renewable energy and efficiency technologies with energy needs in rural and remote areas. The lab works to integrate technologies with services to meet basic human needs, such as providing access to adequate healthy water supplies, health services and education, and promoting productive uses of energy that foster rural development such as water pumping.

To generate reliable, accurate wind and solar resource data and maps, NREL researchers have developed advanced techniques that make use of meteorological and satellite data, models,

custom computer software, and state-of-the-art geographic information system methods. Planners can use these data and maps to identify the best sites for wind, solar, and hybrid renewable energy systems, and to estimate the resources available at any site where renewable applications are contemplated. The resource maps can be combined with geographical, demographic and economic data to identify appropriate technologies and assist planners and developers on deployment options.

NREL's Environmental and International Group has developed several modeling tools to help decision makers analyze renewable energy supply options. People throughout the world use NREL's analysis tools to analyze the performance and reliability of designs for renewable energy systems and their post-maintenance costs and performance.

And finally, NREL's training activities help build the capacity of existing institutions and improve the quality of locally available training and technical information, taking into consideration the realities of the host country's local business environment, available resources, and human capacity.

Conclusion

These efforts are not all that we can do, I realize that. We should invest more in research and development, take greater steps to encourage the use of renewable energy here in the United States, and do more to support R&D partnerships between US scientists and engineers and those in the developing world.

Why? Because for years, developed nations have used energy to increase their own economic wealth and prosperity while polluting the global environment and hindering growth, happiness, and security in poor countries. We have indirectly worsened the plight of people around the world. It is simply a matter of fairness, then, for us to devise solutions for the problems we have created.

We have a responsibility to make renewable energy available and affordable to all, to ensure that the poorest countries in the world are not forced to choose between feeding their people and fueling their economies. It is not something that we choose to do, it is something that we must do to ensure the future of our planet and our species.